

## CLAIMS

We claim:

1. An oscillatory machine comprising a support having a load carrying surface and an opposite surface;  
an electric motor having an airgap through which lines of magnetic flux extend, and an armature coupled to said support, said armature provided with at least two electrically conductive paths each having at least one current carrying segment disposed in said airgap and substantially perpendicularly intersected by said lines of magnetic flux to produce thrust forces which act to move said armature and thus said support in two dimensions in a plane; and,  
10 a bearing support system suspending said armature in said air gap, said bearing support system disposed between said support and said armature.
2. The oscillatory machine of claim 1 wherein said bearing support system comprises at least three ball roller assemblies, each ball roller assembly comprising a ball roller and a roller support surface on which said ball roller rolls, said roller support surface located in a plane between said support and said armature.
3. The oscillatory machine of claim 2 wherein each roller support surface comprises a planar surface which is substantially parallel to a plane containing said support.
4. The oscillatory machine of claim 2 wherein said roller support surface comprises one or more planar surface portions which lie in planes non-parallel to said plane containing said support.
5. The oscillatory machine of claim 2 wherein each roller support surface comprises a concavely curved surface.
6. The oscillatory machine of claim 1 further comprising a motor body and a restraint system coupled between said support and said motor body restraining twisting motion of said support.

7. The oscillatory machine of claim 6 wherein said restraint system comprises a parallelogram arrangement of arms comprising first and second arms pivotally coupled together intermediate their respective lengths, each of said first and second arms having one end resiliently coupled to said motor body.

8. The oscillatory machine of claim 7 wherein said parallelogram arrangement of arms further comprises a third arm pivotally coupled to an opposite end of said first arm, a fourth arm pivotally coupled to an opposite end of said second arm, and a fifth arm pivotally coupled to both said third and fourth arms and rigidly coupled to said support.

9. The oscillatory machine of claim 8 further comprising a hub extending axially of and attached to said support and said armature.

10. The oscillatory machine of claim 9 wherein said fifth arm is rigidly attached to said hub.

11. The oscillatory machine of claim 1 further comprising a self centering system which returns said support to a central position relative to said electric motor when said electric motor is not energized.

12. The oscillatory machine of claim 12 further comprising a hub extending axially of and attached to said support and said armature and wherein said self centering system comprises a rod extending through said hub and resiliently coupled at opposite ends to said support and said motor.